

What is claimed is:

1. A gravel packing apparatus comprising:  
an outer tubular having a plurality of openings therethrough;  
a sand control screen assembly disposed within the outer tubular, the sand control screen assembly preventing the flow of particulate material of a predetermined size therethrough but allowing the flow of production fluids therethrough; and  
a sensor operably coupled to one of the outer tubular and the sand control screen assembly.
2. The apparatus as recited in claim 1 further comprising an instrument line disposed between the outer tubular and the sand control screen assembly, the instrument line operably associated with the sensor.
3. The apparatus as recited in claim 1 further comprising a slurry passageway disposed between the outer tubular and the sand control screen assembly.

4. The apparatus as recited in claim 3 further comprising an instrument line disposed within the slurry passageway, the instrument line operably associated with the sensor.

5. The apparatus as recited in claim 1 further comprising a production pathway disposed between the outer tubular and the sand control screen assembly.

6. The apparatus as recited in claim 5 further comprising an instrument line disposed within the production pathway, the instrument line operably associated with the sensor.

7. The apparatus as recited in claim 1 further comprising an umbilical line disposed between the outer tubular and the sand control screen assembly, the umbilical line including an instrument line operably associated with the sensor, a hydraulic line and a pair of bumper bars.

8. The apparatus as recited in claim 1 further comprising a downhole power source coupled to the sensor.

9. The apparatus as recited in claim 1 further comprising a surface power source coupled to the sensor.

10. The apparatus as recited in claim 1 wherein the sensor is selected from a group consisting of a pressure sensor, a temperature sensor, a density meter and an accelerometer.

11. The apparatus as recited in claim 1 wherein the sensor is coupled to a component selected from a group consisting of a memory, a microprocessor, a transceiver and an actuator.

12. A gravel packing apparatus comprising:

first and second joints each having substantially the same construction and each having a perforated outer tubular, a sand control screen assembly disposed within the outer tubular, a sensor operably coupled to one of the outer tubular and the sand control screen assembly and an instrument line disposed between the outer tubular and the sand control screen assembly, the instrument line having ends that extend exteriorly of the outer tubular, the instrument line operably associated with the sensor;

a coupling that couples the first and second joints together; and

an instrument line connector that connects respective ends of the instrument line from the first and second joints together.

13. The apparatus as recited in claim 12 wherein each joint further comprises a slurry passageway disposed between the outer tubular and the sand control screen assembly.

14. The apparatus as recited in claim 13 wherein the instrument line is disposed within the slurry passageway.

15. The apparatus as recited in claim 12 wherein each joint further comprises a production pathway disposed between the outer tubular and the sand control screen assembly.

16. The apparatus as recited in claim 15 wherein the instrument line is disposed with the production pathway.

17. The apparatus as recited in claim 12 wherein the instrument line is disposed within an umbilical line that includes a hydraulic line and a pair of bumper bars.

18. The apparatus as recited in claim 12 further comprising a downhole power source coupled to each of the sensors.

19. The apparatus as recited in claim 12 further comprising a surface power source coupled to each of the sensors.

20. The apparatus as recited in claim 12 wherein the sensors are selected from a group consisting of pressure sensors, temperature sensors, density meters and accelerometers.

21. The apparatus as recited in claim 12 wherein the sensors are coupled to components selected from a group consisting of memory, microprocessors, transceivers and actuators.

22. The apparatus as recited in claim 12 wherein the coupling further comprises a threaded coupling.

23. The apparatus as recited in claim 12 wherein the coupling further comprises a threaded coupling having timed threads.

24. The apparatus as recited in claim 12 wherein the coupling further comprises a ratch latch.

25. The apparatus as recited in claim 12 wherein the coupling further comprises a collar.

26. The apparatus as recited in claim 12 wherein the instrument line connector further comprises a high pressure instrument line connector.

27. A gravel packing apparatus comprising:

first and second joints each having substantially the same construction and each having a sand control screen assembly having a perforated base pipe and a filter medium, a sensor operably coupled to one of the base pipe and a filter medium and an instrument line disposed between the base pipe and a filter medium, the instrument line having ends that extend exteriorly of the base pipe and the filter medium, the instrument line operably associated with the sensor;

a coupling that couples the first and second joints together; and

an instrument line connector that connects respective ends of the instrument line from the first and second joints together.

28. The apparatus as recited in claim 27 wherein the instrument line is disposed within an umbilical line that includes a hydraulic line and a pair of bumper bars.

29. The apparatus as recited in claim 27 further comprising a downhole power source coupled to each of the sensors.



30. The apparatus as recited in claim 27 further comprising a surface power source coupled to each of the sensors.

31. The apparatus as recited in claim 27 wherein the sensors are selected from a group consisting of pressure sensors, temperature sensors, density meters and accelerometers.

32. The apparatus as recited in claim 27 wherein the sensors are coupled to components selected from a group consisting of memory, microprocessors, transceivers and actuators.

33. The apparatus as recited in claim 27 wherein the coupling further comprises a threaded coupling.

34. The apparatus as recited in claim 27 wherein the coupling further comprises a threaded coupling having timed threads.

35. The apparatus as recited in claim 27 wherein the coupling further comprises a ratch latch.

36. The apparatus as recited in claim 27 wherein the coupling further comprises a collar.

37. The apparatus as recited in claim 27 wherein the instrument line connector further comprises a high pressure instrument line connector.

38. A method for treating an interval of a wellbore, the method comprising the steps of:

locating a gravel packing apparatus having an outer tubular positioned around a sand control screen assembly within the interval of the wellbore forming a wellbore annulus;

injecting a treatment fluid into the wellbore annulus; and

monitoring the treatment process with a sensor operably coupled to one of the outer tubular and the sand control screen assembly.

39. The method as recited in claim 38 further comprising disposing an instrument line between the outer tubular and the sand control screen assembly and operably associating the instrument line with the sensor.

40. The method as recited in claim 39 further comprising disposing the instrument line within a slurry passageway disposed between the outer tubular and the sand control screen assembly.

41. The method as recited in claim 39 further comprising disposing the instrument line within a production pathway disposed between the outer tubular and the sand control screen assembly.

42. The method as recited in claim 38 further comprising disposing an umbilical line between the outer tubular and the sand control screen assembly, the umbilical line including an instrument line operably associated with the sensor, a hydraulic line and a pair of bumper bars.

43. The method as recited in claim 38 further comprising powering the sensor with a downhole power source.

44. The method as recited in claim 38 further comprising powering the sensor with a surface power source.

45. The method as recited in claim 38 further comprising selecting the sensor from a group consisting of a pressure sensor, a temperature sensor, a density meter and an accelerometer.

46. The method as recited in claim 38 further comprising coupling the sensor to a component selected from a group consisting of a memory, a microprocessor, a transceiver and an actuator.

47. A method for treating an interval of a wellbore, the method comprising the steps of:

coupling first and second joints of a gravel packing apparatus together, each joint have a sensor operably associated therewith and an instrument line disposed therein having ends that extend outwardly therefrom;

connecting the ends of the instrument lines from respective joints of the gravel packing apparatus;

locating the first and second joints within the interval of the wellbore forming a wellbore annulus;

injecting a treatment fluid into the wellbore annulus; and

monitoring the treatment process with the sensors.

48. The method as recited in claim 47 further comprising disposing the instrument line between an outer tubular and a sand control assembly of each joint.

49. The method as recited in claim 48 further comprising disposing the instrument line within a slurry passageway of each joint.

50. The method as recited in claim 48 further comprising disposing the instrument line within a production pathway of each joint.

51. The method as recited in claim 47 further comprising disposing the instrument line between a base pipe and a filter medium of each joint.

52. The method as recited in claim 47 further comprising disposing the instrument line within an umbilical line that includes a hydraulic line and a pair of bumper bars.

53. The method as recited in claim 47 further comprising powering the sensors with a downhole power source.

54. The method as recited in claim 47 further comprising powering the sensors with a surface power source.

55. The method as recited in claim 47 further comprising selecting the sensors from a group consisting of a pressure sensor, a temperature sensor, a density meter and an accelerometer.

56. The method as recited in claim 47 further comprising coupling each of the sensors to a component selected from a group consisting of a memory, a microprocessor, a transceiver and an actuator.